

## **Implicit Differentiation Worksheet**

Use implicit differentiation to find the derivative:

1.  $x^2 - y^2 = 1$

2.  $xy = 1$

3.  $x^3 + y^3 = 1$

4.  $\sqrt{x} + \sqrt{y} = 1$

5.  $16x^2 + 25y^2 = 400$

6.  $x^2 + xy + y^2 = 9$

7.  $3x^2y + 2xy^3 = 1$

8.  $(x-1)y^2 = x+1$

9.  $2xy - y^2 = 3$

10.  $x^{2/3} + y^{2/3} = 1$

Find the slope of the curve at the given point:

11.  $x^2 + y^2 = 25$ ;  $(3, -4)$

12.  $xy = -8$ ;  $(4, -2)$

13.  $x^2y = x + 2$ ;  $(2, 1)$

14.  $x^{1/4} + y^{1/4} = 4$ ;  $(16, 16)$

15.  $xy^2 + x^2y = 2$ ;  $(1, -2)$

16.  $\frac{1}{x+1} + \frac{1}{y+1} = 1$ ;  $(1, 1)$

17.  $12(x^2 + y^2) = 25xy$ ;  $(3, 4)$

18.  $x^2 + xy + y^2 = 7$ ;  $(3, 2)$

19.  $\frac{1}{x^3} + \frac{1}{y^3} = 2$ ;  $(1, 1)$

20.  $xy^5 + x^5y = 1$ ;  $(-1, -1)$

### **Implicit Differentiation Worksheet: Key**

1.  $y' = \frac{x}{y}$

2.  $y' = -\frac{y}{x}$

3.  $y' = -\frac{x^2}{y^2}$

4.  $y' = -\frac{\sqrt{y}}{\sqrt{x}}$

5.  $y' = -\frac{16x}{25y}$

6.  $y' = \frac{-2x - y}{x + 2y}$

7.  $y' = \frac{-6xy - 2y^3}{3x^2 + 6xy^2}$

8.  $y' = \frac{1 - y^2}{2xy - 2y}$

9.  $y' = \frac{-y}{x - y}$

10.  $y' = -\frac{y^{1/3}}{x^{1/3}}$

11.  $y' = \frac{3}{4}$

12.  $y' = \frac{1}{2}$

13.  $y' = -\frac{3}{4}$

14.  $y' = -1$

15.  $y' = 0$

16.  $y' = -1$

17.  $y' = \frac{4}{3}$

18.  $y' = -\frac{8}{7}$

19.  $y' = -1$

20.  $y' = -1$